APPENDIX 4-A

STORAGE OF COLUMBIUM/TANTALUM SOURCE MATERIALS

1. *Description.* Columbium and Tantalum Source Materials are used to derive elemental columbium and tantalum or columbium/tantalum compounds and may be received in the form of natural mineral concentrates, synthetic concentrates, chemically processed materials and concentrates; and metal oxide content materials. When columbium source materials are acquired, it shall meet Purchase Specification P-113 (Latest Revision); when tantalum source materials are acquired, it shall meet Purchase Specification P-113a (Latest Revision).

The ores and concentrates are heavy materials ranging in color from reddish brown to black and are called columbite if columbium content is predominant or tantalite if tantalum content is predominant. The oxide material is usually fine powder, heavy, and white in color.

2. *Packaging.*

a. When received for storage, all columbium/tantalum source material shall be packed in full round bottom polyethylene bags which have been inserted into new 30 or 55 gallon steel drums. The drum type, size, gauge, and finish shall be specified by the acquiring Government agency in the contract and shall be in accordance with Defense National Stockpile Container Specification - Drums: Steel, Hot Dipped Galvanized or Painted. If palletization is necessary, pallet requirements shall be detailed in the purchase contract and shall be in accordance with Federal Specification NN-P-71, latest revision - Pallet, Material Handling, Wood, Stringer Construction, 2 Way and 4 Way (Partial).

b. Some of the previously acquired material for storage was received in bags, wooden kegs, wooden boxes, and pails.

3. *Marking.*

Prior to receipt, each container/drum shall have sufficient aluminum tags, as specified in the purchase contract and conforming to Defense National Stockpile Specification - Tags: Aluminum, Embossed, T-1, latest revision, affixed by a suitable adhesive. Information embossed on the tag, the number of tags to be affixed on each drum, and tag placement location shall be specified in the purchase contract.

4. *Storage.*

a. Columbium/Tantalum Source Material in bags will be stored in box pallets in a dry warehouse until such time repackaging is necessary. Segregation will be by contract number and lot number. Special separation between lots in storage is not required.

b. To facilitate the taking of a physical inventory at any time by count and computation the same number of bags shall be placed in each box pallet. Each block stack shall have a Warehouse Materials Identification Card indicating the number of bags in each box pallet in the stack. Thereafter the pallets shall be block stacked in uniform rows and to a uniform height. In doing so, economical use of space must be given full consideration and segregation requirements must be met.

APPENDIX 4-A

STORAGE OF COLUMBIUM/TANTALUM SOURCE MATERIALS

c. Columbium/Tantalum Source Materials in conventional drums shall be stored in a warehouse, shed or other structure so as to protect drums from the weather. Material, when received in galvanized steel drums, may be stored in the open on concrete runners when specifically authorized by the Directorate of Stockpile Operations.

d. In every case, storage integrity shall be maintained by a complete description of each lot indicated on a locator card which shall be prominently displayed on and securely attached to the front stack in each row. DNSC storage sites will use the Warehouse Materials Identification Card (DNSC Form 41) for this purpose. These forms, which are specifically designed for use with stockpile material, will be furnished to military depots upon request.

e. If the material is not palletized and is to be stored in a warehouse, shed or other structure, the first tier of drums shall be placed on floor pallets in upright position after which one inch thick, random length and width hardwood dunnage lumber shall be used between each succeeding tier. If the use of dunnage lumber between tiers is not practicable because of weight of drums or difficulty in handling, pallets between tiers may be used.

f. When pallets are used a uniform number of drums shall be placed on each pallet, except when an odd number on the top pallet (light pallet) of a stack of uniform height will complete the lot. Pallets shall be stacked four high with a weight factor of 1,000 lb/sq. ft

g.Transportation aisles shall not exceed that required for the efficient operation of local material handling equipment. Storage will be kept at least 36 inches below automatic sprinkler heads. Twenty-four (24) inch aisles shall be maintained between stored material and all walls for inspection purposes.

h. Galvanized drums designated for storage in the open shall be stored on their sides with the joint of the locking ring that holds the head on the drum in the bottom position and stacked in cordwood fashion on concrete runners or blocks. Storage aids used to keep stacks stable shall be of concrete. Use of cinder block is prohibited. The space utilized shall be equivalent to Type B or better, and be capable of sustaining a load of not less than 2,000 lbs./sq.ft.

i. Maximum stacking height of drums stored in open space will be four drums high. The maximum width of a storage block will be four drums, unless otherwise directed by Stockpile Operations. Inspection aisles of not more than 3 feet shall be maintained between storage blocks. Main transportation aisles shall not exceed that required for the operation of local handling equipment. Each lot should be stored so that it is readily accessible for outshipment. Lots may be stored in adjacent rows within the block. A row may contain parts of two lots, provided each lot is readily accessible by use of overhead handling equipment and lot integrity is maintained with locator cards designating lots.

j. Drums shall be stored in uniform rows and tiers so as to facilitate the taking of an inventory at any time by counting the rows and tiers and computing the total quantity. In doing this, however, economical use of space must be given full consideration and all segregation and other requirements must be met.

APPENDIX 4-A

STORAGE OF COLUMBIUM/TANTALUM SOURCE MATERIALS

k. Drums now in storage may sometimes be marked only on sides. In order to identify contents of drums to be stored cordwood fashion in open space, it may be necessary for the depot to mark the required identity data on the top cover of drums, or to attach an appropriate identification tag to the clamp ring bolt, whichever is deemed feasible under the conditions involved and authorized by DNSC.

l. Columbium/Tantalum Source Materials that are licensable with the NRC should be stored either in a designated area, separate warehouse section or a roped off area of a warehouse. The method of restriction, if any, is dependent on the dose rate and on applicable NRC Regulations and/or the DNSC Radiological Protection Program. Any questions concerning the storage shall be addressed to the DNSC Safety, Health and Environmental Staff for guidance.

5. *Precautions To Be Taken.*

a. *Health and Safety*

Columbium/Tantalum ore and minerals, as well as columbium/tantalum products derived by physically or chemically processing certain ores, such as pyrochlore and euxenite, may have naturally occurring radioactive (low level) characteristics and have potentially hazardous properties.

Since this material may be considered radioactive and/or hazardous, DLA/DNSC Material Safety Data Sheets for tantalite, columbite, tantalum and columbium oxide shall be consulted as well as the DNSC Radiation Protection Program.. Any questions should be referred to the DNSC Safety, Health, and Environmental Staff.

Repackaging is not to be undertaken without contacting Stockpile Operations and the DNSC Safety, Health and Environmental Staff for guidance. Dust from Ta/Cb source materials may be irritating to the lungs and eyes and the appropriate respiratory and eye protection shall be provided to personnel engaged in repackaging this material.

b. General.

Since Columbium/Tantalum Source Materials are heavy minerals and some drums or kegs may not be filled to capacity, the material should be handled with extreme caution as an off-balance unit.

Rough handling may cause extensive damage to drums or pallets. When being received, if any drums/pallets show evidence of damage, the damaged drums or pallets shall be replaced. Severe damage shall be reported in the usual manner through the media of an Over, Short and/or Damage Report. Proper care shall be exercised in handling and shipping to avoid damage.

6. Average Storage Factor. 13 Square feet per short ton.

7. Shipping

APPENDIX 4-A

STORAGE OF COLUMBIUM/TANTALUM SOURCE MATERIALS

a. Department of Transportation (DOT) regulations for safe transport of **domestic** shipments defined as radioactive as specified in 49 CFR 173.403 (LSA-1)(material having a specific activity greater than 70 Becquerels per gram (Bq/g)) require strong tight packaging.

b. If these materials are shipped internationally, TS-R-1, specifies that the materials must be shipped in Industrial Packaging Type 1 (IP-1). The International Regulation, Regulations for the Safe Transport of Radioactive Material (revised in 2000) (TS-R-1) defines radioactive material for international transportation as material that has a specific activity greater than 10 Becquerels per gram (Bq/g) and a total activity for the consignment that exceeds 1000 Bq/g. Current Stockpile packaging does not meet IP-1 standards.

Shipment Procedures For Radioactive Tantalum/Columbium Source Material (Ship in accordance with 49 CFR 173.427)

1. CONVEYANCE AND MATERIAL

- Lots designated radioactive will be shipped as follows:

- Inspect and document that the drums are suitable for shipment. This is a separate report to be accomplished by a General Supply or Environmental Protection Specialist. The report form is included herein. Original of the report is given to the Depot Manager; the only copy is given to a Specialist who will use it as an attachment to the DLAH Form 32 Sales Shipment Report. Drums that do not pass inspection, and are likely to release materials during transit, must be repackaged.

- The drums do not have to be labeled, but the outer packaging (plastic bag or "supersack") 1) must be marked or stenciled "Radioactive-LSA" on two opposite sides and 2) must be marked with the name and address of the consignor and consignee.

- Drums must be banded and braced to prevent shifting under conditions normal to transportation.

- Conveyances must be closed van or rail car and must be exclusive use.

- Conveyance must be placarded "Radioactive 7". See 49 CFR 172.556 for details of the placard. The purchaser or his representative must placard the truck. We will placard rail car shipments.

2. SHIPPING PAPERS

- The purchaser will be the shipper *of record.* Though DOT regulations also identify us as an "offeror" of this material (since we have made the DOT classification determination and performed the packaging function), we still require the purchaser or his representative to sign the shipping papers.

- Specific instructions for maintenance of exclusive use must be provided to the carrier and included with shipping paper information. Bill of lading must be annotated "Specific Instructions for

Exclusive Use Control Attached." This should be conveyed to the dispatcher when arranging for shipments.

- The appropriate DOT shipping information is:

Proper Shipping Name:	Radioactive material, LSA, n.o.s.
Hazard Class:	7
ID / UN Number:	UN 2912
Emergency Response Phone:	Shipper of Record's emergency phone number. MSDS and/or Emergency Response Guide 170 should be attached to the shipping paper

- The Shipper Certification Statement is to be signed by the purchaser or his agent.

- Foreign shipments of this material is not permitted since stockpile containers are presently unsuitable for this use.

3. RADIATION PROTECTION

- Depot RPO (or RSO) monitors the packages to assure that gamma radiation does not exceed 10 mR/hr at a distance of one meter (3.3 feet). If dose rates exceed this level see 49 CFR 173.441(b) for further radiation level limits. A written record of the monitoring shall be included in, or attached to, the sales shipment report.

4. CONTAMINATION CONTROL OVERPACKAGING

- For domestic shipment of these materials, repackaging in clean "strong tight" packages is the most attractive option for the DNSC. These materials, with the current packaging and pallet, will be placed inside a clean heavy gauge (6 mil) plastic bag or a "supersack." The plastic bag or supersack is then sealed and becomes the "strong tight" package described in 49 CFR 173.427(c)(1). Care must be taken during packaging to ensure that all hard points on the drums and pallets covered by the bag or supersack are padded to prevent abrasion from breaching the bag or supersack during handling and transport. The following outlines the overpacking process to produce "strong tight" packages:

  - 1) Place a pallet on the floor.
  - 2) Place cardboard padding on the pallet.
  - 3) Using a forklift, pick up the pallet with drummed material.

  - 4) Carefully pad all hard points like pallet corners, edges, and drum edges with cardboard cushioning material.
  - 5) Slide a heavy gauge plastic bag or supersack over the pallet and drums while it is suspended on the forklift tines.

APPENDIX 4-A

STORAGE OF COLUMBIUM/TANTALUM SOURCE MATERIALS

- 6) Set the bagged pallet onto the cardboard covered pallet and remove the forklift.
- 7) Seal up the plastic bag or supersack.
- 8) Band up, do not staple, the cardboard tray around the base of the bagged pallet.
- 9) Finally, band the entire bagged load to the bottom pallet taking care to pad any potential chafe points.
- 10) Mark or stencil "Radioactive-LSA" on two opposite sides of the package (49 CFR 173.427(6)(vi).
- 11) Mark package with consignee's and consignor's name and address (49 CFR 172.301(d).

APPENDIX 4-A

STORAGE OF COLUMBIUM/TANTALUM SOURCE MATERIALS

SALES CONTRACT NO._____ **Release No._____**

MATERIAL NAME _____

PURCHASE CONTRACT NO.(S)_____

PURCHASE LOT NO.(S)_____

TOTAL NO. DRUMS IN SHIPMENT_____

DEPOT_____

OSR Number_____ Date Issued_____

CLOSED VAN/BOX CAR NO._____

Total Shipment Wt. (Lbs.): Gross_____Net_____

This is to certify that the drums in this shipment have been visually inspected and found to be sound and tight. No holes were detected, the bung seals (if applicable) are intact and locking rings and bolts/nuts are tight. All drums in this load are suitable for transportation.

_____ _____
Signature Date

Limited Distribution: Original to DNSC Depot Manager

APPENDIX 4-A

STORAGE OF COLUMBIUM/TANTALUM SOURCE MATERIALS

INSTRUCTIONS FOR EXCLUSIVE USE SHIPMENT CONTROLS

The conveyance is for the sole use by a single consignor and all loading and unloading is to be executed under the direction of the consignor or consignee.

Changing or altering this conveyance in any way before this shipment reaches its destination is prohibited except for emergency situations. Similarly there should be no entry into this conveyance before it reaches its destination.

If the seal applied at point of origin has to be removed, the carrier must reseal the conveyance as soon as possible, and then must note on the bill of lading, the new seal number as well as the reason for the removal of the original seal.

FOR ADDITIONAL INFORMATION ON THIS COMMODITY, REFER TO THE MATERIAL SAFETY DATA SHEET OR THE MOST RECENT PURCHASE SPECIFICATION.